Readfield Quadrangle, Maine

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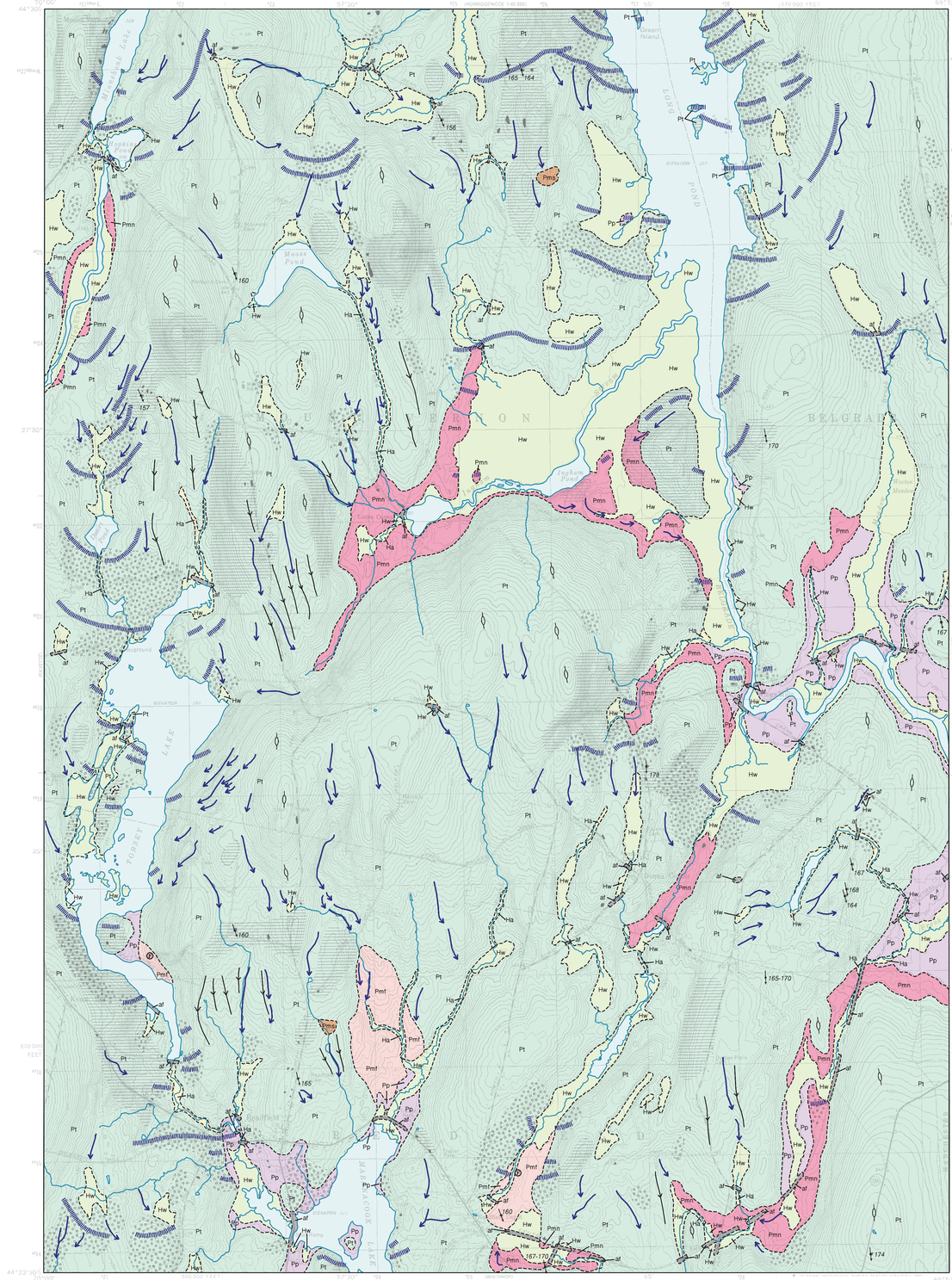
For additional information, see Open-File Report 04-41.

Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping of the Readfield quadrangle was conducted by Carol T. Hildreth during the 2003 field season. Funding for this work was provided by the U. S. Geological Survey STATEMAP program and the Maine Geological Survey, Department of Conservation.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Readfield quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

NOTE: A thin, discontinuous layer of windblown sand and silt, generally mixed with underlying glacial deposits by frost action and bioturbation, is present near the ground surface over much of the map area but is not shown.

af

Artificial fill - Man-made. Material may vary from natural sand and gravel to quarry waste to sanitary landfill, includes highway and railroad embankments. This material is mapped only where it can be identified using the topographic contour lines or where actually observed. Minor artificial fill is present in virtually all developed areas of the quadrangle. Thickness of fill varies.

Ha

Stream alluvium (Holocene) - Sand, silt, gravel, and muck in flood plains along present rivers and streams. As much as 3 m (10 ft) thick. Extent of alluvium indicates most areas flooded in the past that may be subject to future flooding. In places the unit is indistinguishable from, grades into, or is interbedded with wetlands deposits (Hw).

Hw

Freshwater wetland deposit (Holocene) - Muck, peat, silt, and sand deposited in poorly drained areas. Generally less than 3 m (<10 feet) thick, but may be thicker in bogs. In places, this unit is indistinguishable from, grades into, or is interbedded with stream alluvium (Ha).

Pmn

Marine nearshore deposits (Pleistocene) - Sand, silt, mud, and minor gravel. Consists of reworked till and glaciomarine sediments redistributed by marine currents and wave action as sea level fell during late-glacial time. May include shoreline, beach, and dune deposits in places. As much as 3 meters (10 ft) thick.

Pms

Marine shoreline deposits (Pleistocene) - Sand and gravel. Consists of coarse-grained, sorted, stratified materials deposited, in contact with or beyond the ice front, at or near the shoreline of the maximum extent of late-glacial sea level. As much as 10 m (30 feet) thick.

Pmf

Marine fan deposits (Pleistocene) - Mostly sorted and stratified sand, gravel, and silt. Consists of glaciomarine fan deposits laid down in the late-glacial sea directly in contact with or just beyond the ice front by meltwater streams. Parts of these fan deposits have been coated by silt and clay of the Presumpscot Formation (Pp) and parts have been reworked, winnowed, and resorted by late-glacial and postglacial wave and current action as sea level fell. Thickness varies from 0 to over 15 m (0-50 ft).

Pp

Presumpscot Formation: Glaciomarine bottom deposits (Pleistocene) - Silt and clay with local sandy beds and intercalations. Consists of late-glacial submarine fine-grained sea-floor deposits. Commonly lies beneath surface deposits of units Pmn, Pmf, and Pmd; in places may be overlain by unmapped thin dune deposits. As much as 21 meters (70 feet) thick.

Pt

Till (Pleistocene) - Light- to dark-gray, nonsorted to poorly sorted mixture of clay, silt, sand, pebbles, cobbles, and boulders; a predominantly sandy diamicton containing some gravel. Generally older than other glacial deposits and may underlie them. Thickness varies and generally is less than 6 m (20 ft) but may be more than 30 m (100 ft) in areas of streamlined topography. Many streamlined hills in this area are bedrock-cored.

Bedrock exposures - Not all individual outcrops are shown on the map. Gray dots indicate observed outcrops; ruled pattern indicates areas of abundant exposures and areas where surficial deposits are generally less than 3 m (10 ft) thick. Mapped in part from aerial photography; soil surveys (Faust and LaFlamme, 1978); previous geologic maps (Thompson, 1977, Thompson and Borns, 1985; Cameron and others, 1984) and materials maps (Locke, 1999).

Contact - Boundary between units, approximately located.

Direction of meltwater or meteoric water flow over outwash, alluvium, or till deposit.

135 **Glacial striation** - Point of observation is at dot. Arrow shows ice-flow direction inferred from striations on bedrock. Number is azimuth (in degrees) of flow direction.

Drumlin or other glacially streamlined hill. Symbol is parallel to glacial ice movement.

Grooved till surface - Symbols show lengths and direction of narrow ridges inferred to have been carved in till by flow of glacial ice.

Ice-margin position - Line shows inferred approximate position of ice margin during glacial retreat, based on topographic highs and a variety of other factors from place to place - including accumulations of surface boulders, associated coarse-grained stratified deposits, associated roughly parallel meltwater channels, etc.

Abundant large boulders.

Marine fossil locality.

REFERENCES

Cameron, C. C., Mullen, M. K., Lepage, C. A., and Anderson, W. A., 1984, Peat resources of Maine - Volume 4: southern and western Maine: Maine Geological Survey, Bulletin 31, 123 p.

Faust, A. P., and LaFlamme, K. J., 1978, Soil survey of Kennebec County, Maine: U.S. Department of Agriculture, Soil Conservation Service, 87 p., scale 1:20,000.

Locke, D. B., 1999, Surficial materials of the Readfield quadrangle, Maine: Maine Geological Survey, Open-File Map 99-67, scale 1:24,000.

Thompson, W. B., and Borns, H. W., Jr. (editors), 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Thompson, W. B., 1977, Reconnaissance surficial geology of the Augusta quadrangle, Maine: Maine Geological Survey, Open-File Map 77-23, scale 1:62,500.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Hildreth, C. T., 2004, Surficial geology of the Readfield 7.5-minute quadrangle, Kennebec County, Maine: Maine Geological Survey, Open-File Report 04-41.
2. Hildreth, C. T., and Locke, D. B., 2004, Surficial materials of the Readfield quadrangle, Maine: Maine Geological Survey, Open-File Map04-39.
3. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print).